

# Classification of food Based on Perishability

Some foods have longer shelf life than others. Perishability refers to the quickness with which a food gets spoilt. Foods can be classified into three groups depending on how long they can be kept without any treatment.

Perishable foods can be kept at room temperature for only few hours or 1 or 2 days before spoiling. For example- milk and milk products, meat, fish, poultry, fruits, leafy vegetables and cooked food. These foods keep well under refrigeration at household as well as commercial level. In general, the most perishable foods contain a high level of protein or have moisture and carbohydrates in them. Special methods are used to preserve such foods. The rate of spoilage varies with the temperature, moisture and or dryness of the environment. Storage of perishable foods should be done by keeping following points in mind.

Flesh foods like meat, chicken and fish need to be kept frozen at  $-60^{\circ}\text{C}$  in a deep freeze for long term storage. These foods should not be left at room temperature for more than an hour or two. Organ meats tend to spoil faster than muscle meat. Ground meats spoil faster because of high surface area exposed to contamination.

Eggs are best kept in a cool place or in a basket in an airy room refrigerator. Never wash eggs before storing. Store eggs with their pointed end downwards.

Milk in boiled form can be kept at room temperature for 6 to 12 hours during winters. Inside a refrigerator milk can last 3 to 4 days or even more in closed container.

The keeping quality of a vegetable depends upon its nature. Leafy vegetables wilt and deteriorate within minutes of buying unless they are kept wrapped in a damp cloth or inside a plastic bag in the refrigerator wherein they last for more than a day or two.

All other vegetables keep well in a cool place with relatively high humidity in a basket covered with a damp cloth.

Vegetables must be kept in plastic bags to prevent drying by evaporation, if stored in a refrigerator.

Do not wash fruits before storing as they spoil faster.

Remember not to, refrigerate bananas, pineapples, papayas and avocados, as these fruits undergo undesirable changes in texture and flavour at refrigerator temperature. Most other fruits keep well, when refrigerated.

Semi-perishable foods can be stored for a couple of weeks or even a month or two without any detectable signs of spoilage. Temperature and humidity of the environment again affects the shelf stability of such foods. Proper handling and storage can result in fairly long storage without spoilage. Examples are all cereal and pulse products like wheat flour, semolina, vermicelli, broken wheat, Bengal gram flour, and some fruits and vegetables like citrus fruits, aonla, apples, pumpkin, roots and tubers, yams, potatoes, onions, garlic etc. Following points should while storing semi-perishable foods. Processed cereal products develop an off-flavour or are infested by insects very easily if not taken care. Therefore, they should be sieved and cleaned of all such contamination, exposed to the sun for a few hours, allowed to cool and then stored in tightly covered bottles or other containers.

Especially onions and potatoes should be stored in a cool, dry and airy place to prevent them from developing moulds or growing shoots. They are best hung up from the ceiling in a wire or plastic-mesh basket, or kept in mesh containers which permit air circulation.

Nuts become rancid and get infested with insects very easily, therefore, they should be bought in large quantities only when storage space is available.

Fruits like apples, oranges and semi-ripe mangoes do last for a few weeks and should be put in a basket lined and covered with paper to prevent them from drying up. They need a cool environment to last long.

Non-perishable foods will keep for months or years without spoiling unless handled and stored carelessly. Examples of such foods are all preserved food products (canned, dried, pickled etc.), whole

cereal, pulse and millet grains, oil seeds, nuts, fats and oils, honey, sugar, jaggery, salt, some spices and essence. Following points should be followed while storing non-perishable foods:

Food should be carefully cleaned i.e. free from gravel, husk and other foreign matter etc. and dried thoroughly in the sun/ drier before storage.

Storage of foods should be done in clean containers with tight-fitting lids. Containers can be made of tin, aluminum, plastic or glass. Clay pots or gunny bags may also be used in case of large quantities.

A dry, cool and dark area should be chosen for storage of non-perishable foods.

The perishability of food dictates to a considerable extent the preservation techniques that are used to keep that food in good quality. In case of non-perishable foods, preservation techniques are dedicated to keeping out insects, rodents and other pests and keeping the foods dry to prevent it from becoming moldy. Perishable and semi-perishable foods depend a great deal on the technologies of refrigeration, drying, freezing, canning and the use of chemical preservatives to give shelf stability.

These treatments can make such food commodities keep for many months or years if they are performed properly

## Contamination and Cross Contamination

Microbial Contamination of food can be defined as accidental and/or intended addition of contaminants like bacteria, virus, fungus etc. and/or their toxins & by-products in food causing spoilage of food and diseases in human beings.

### Cross Contamination

Cross-Contamination in food can be defined as the physical movement or transfer of microbial contaminants from one person, object, or place to another. There are three main types of cross contamination: food-to-food, equipment-to-food, and people-to-food.

## Contamination Spoilages of Various Food with the Storing Method

### Spoilages of various foods

- Many food borne microbes are present in healthy animals (usually in their intestines) raised for food. Meat and poultry carcasses can become contaminated during slaughter by contact with small amounts of intestinal contents.
- Fresh fruits and vegetables can be contaminated if they are washed or irrigated with water that is contaminated with animal manure or human sewage.
- Some types of Salmonella can infect a hen's ovary so that the internal contents of a normal looking egg can be contaminated with Salmonella even before the shell is formed.
- Oysters and other filter feeding shellfish can concentrate *Vibrio* bacteria that are naturally present in sea water, or other microbes that are present in human sewage dumped into the sea.
- Later in food processing, other food borne microbes can be introduced from infected humans who handle the food, or by cross contamination from some other raw agricultural products.
- For example, *Shigella* bacteria, hepatitis A virus and Norwalk virus can be introduced by the unwashed hands of food handlers who are themselves infected.

- In the kitchen, microbes can be transferred from one food to another food by using the same knife, cutting board or other utensil to prepare both without washing the surface or utensil in between.
- A food that is fully cooked can become re-contaminated if it touches other raw foods or drippings from raw foods that might contain pathogens microbes responsible for spoilage.
- The way in which food is handled after it is contaminated can also make a difference in whether or not an outbreak occurs.
- Lightly contaminated food left out overnight can be highly infectious by the next day. Given warm moist conditions and an ample supply of nutrients, a bacterium that reproduces by dividing itself every half hour can produce 17 million progeny in 12 hours.
- If the food is refrigerated promptly, the bacteria multiply at a slower rate. However, *Listeria monocytogenes* and *Yersinia enterocolitica* can actually grow at refrigerator temperatures.